

REMARKS

Claims 1 - 10 remain active in this application. Claims 11 - 20 have previously been canceled. Claim 10 has been withdrawn from consideration as being non-elected, with traverse, in response to a requirement for election of species. Claim 1 has been amended to emphasize novel aspects of the invention. New claim 21 has been added to more fully define subject matter regarded as the invention. The indication of allowability of claims 8 and 9 is noted with appreciation. Claims 22 and 23 have been added to rewrite allowed claim 8 in independent form with claim 23, corresponding to claim 9, depending therefrom. Support for the amendments of the claims, including new claim 21, is found throughout the application, particularly in Figures 3, 6 and 9 and the description of the invention in paragraph [0018]. No new matter has been introduced into the application.

Claims 1 - 5 have been rejected under 35 U.S.C. §102 as being anticipated by Li. Claims 1 - 4, 6 and 7 have been rejected under 35 U.S.C. §103 as being unpatentable over Besser et al. in view of Lopatin. Claim 5 has been rejected under 35 U.S.C. §103 as being unpatentable over Besser et al. in view of Lopatin and Wang. These grounds of rejection are respectfully traversed for the reasons made of record in previous responses which are hereby fully incorporated herein by reference and the further remarks provided below and particularly as being moot in view of the amendments to claim 1 made above.

Li teaches a structure similar to the present invention in several respects but is respectfully submitted not to be anticipatory of any claim. While Li refers (at column 5, lines 30 - 37) to a "graded alloy

composition of the alloy layer 116, 216" that passage also indicates that such a layer is formed "by depositing several very thin and alternating sublayers of two metals" of varying thickness "to provide a graded composition". These very thin layers are indicated to have a thickness of only one atomic layer. While the layer so developed is said to act "as a barrier-seed-adhesion layer" there appears to be no mention of "graded mechanical characteristics" or that the layer is "stable", as recited in claim 1, resulting from a layer formed in such a manner. The Examiner has not asserted inherency in regard to this deficiency in the teachings of Li and no basis is seen in Li for doing so. Therefore, it is respectfully submitted that the Examiner has not, in fact, demonstrated claim 1, as currently rejected, or any claim depending therefrom to be anticipated by Li.

It is respectfully submitted that the combinations of Besser et al. and Lopatin or Besser et al., Lopatin and Wang similarly fail to answer recitations of the claims as currently rejected. Besser et al. is directed to formation of an alloy region at the base of a via to be formed and which is below a barrier in the completed structure. Again, there is no indication that the alloy so formed will be stable or have graded mechanical characteristics. Lopatin teaches forming a multi-layer composite layer 224 of layers 225, 226 and 227 of an alloy of copper and tin where the concentration of nitrogen is decreased from layer to layer until the nitrogen concentration is decreased to zero. There does not appear to be a change in the relative concentrations of copper and nitrogen between layers. Therefore, it is respectfully submitted that the combination of Besser et al. and Lopatin provide "graded mechanical

characteristics" or a "stable" alloy. Again it is respectfully pointed out that Wang is cited solely for teaching of particular barrier layer materials and has not been asserted to mitigate the deficiencies of Besser et al. and Lopatin as previously pointed out. Further, the Examiner has not indicated any basis for asserting inherency or properties or characteristics which would be expected by one of ordinary skill in the art based on the combination of Besser et al. and Lopatin which would support a conclusion of obviousness in regard to such explicit recitations of the claims which the Examiner appears to have ignored. Therefore, the Examiner has not made and cannot make a *prima facie* demonstration of obviousness based on either asserted combination of references. Accordingly, it is again respectfully submitted that the asserted grounds of rejection under 35 U.S.C. §103 are clearly in error and untenable.

However, to expedite the prosecution of this application, claim 1 has been amended to recite that the stable alloy region has a continuously graded concentration of alloying material from a reaction front where a stoichiometric alloy is formed as well as graded mechanical properties and that the confinement of the stable alloy region is accomplished not only by the barrier but by the complete reaction of the alloying material. These distinctive features of the invention are clearly not taught or suggested by the references applied against the claims by the Examiner and cannot be asserted to be inherent therein because of the structures used to produce the barrier, seed and/or adhesion properties in the manner disclosed in those references, taken in any combination.

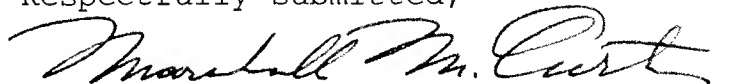
Therefore, it is respectfully submitted that the subject matter of claims 1 - 7, particularly as amended

above, is clearly and patentably distinct from the references applied by the Examiner, that the asserted grounds of rejection are clearly in error in regard to claims 1 - 7 as currently rejected and that such asserted grounds of rejection are clearly untenable in regard to claims 1 - 7 as now amended. Accordingly, reconsideration and withdrawal thereof are requested.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Deposit Account No. 09-0458 of International Business Machines Corporation (E. Fishkill).

Respectfully submitted,



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